

and this fact may be proved by a simple process. Take a few shillings and pieces of sheet iron, of the same size, if you choose: place these in a tumbler so as to form a pile or heap. Pour upon the whole some clear water; it will soon acquire the taste of iron, and become of a yellowish tint. In twenty-four hours flakes of oxide of iron will appear. We may thus easily make chalybeate water, and have a perpetual supply without going a mile from home. Copper will do as well as silver with the iron plates: but the oxide of copper, verdigris, is dangerous; whereas steel filings or iron may be taken with safety, being often prescribed medicinally.

We have one remark to make before closing these observations upon matter; it is this: all our knowledge of the substances composing our earth, so far as it is related to the present subject, is either geometrical or philosophical; the first considers matter as being of some magnitude, or circumscribing space, and having some figure, thence called body, and is usually denominated *stereometry*, or the mensuration of magnitudes of three dimensions, length, breadth, and thickness; and the second comprehends all the properties of matter addressed to the senses, which may be styled physical or philosophical, because all the phenomena of nature are conceived to result immediately from them; as extension, solidity, inertia, and those apparently more active properties, gravity, magnetism, electricity, attraction, repulsion, elasticity.

These last are mechanical affections of matter; but its philosophical properties—distinguishable into general and specific—are such as universally adhere to every species of matter, and of which no art can divest them,—as *extension*, solidity, mobility, quiescence, inertia, figure, attraction, repulsion. Moreover, the ductility, fluidity, transparency, hardness, elasticity of matter, and of which we have in some measure already spoken, are discriminating qualities, ascertained principally by observation and experiment, though co-existent with all matter, independent of our observation or experiment. And who can tell what subordinate attributes the Creator hath impressed upon matter? And whether any inexplicable effect be owing to his immediate fiat, or some secondary material power, cannot be known; for the action of a pure spirit upon matter cannot be comprehended.

It has been argued by materialists, that we know nothing at all about what we call spirit; yet what do they know about matter except by its properties, which are manifested to their senses? Spirit is conscious of itself, and that consciousness is the sole ground of our belief in its being. What is the whole life of all human creatures, but one continual self-consciousness, varied in ten thousand times ten thousand ways! This spirit, united by life to material being, sees no spirit but itself, if I may so speak; but it sees living bodies like to that which it inhabits—warm in life—bounding with motion—characterized by gestures, looks, voice, speech responding to its own, in command, entreaty, or sympathy; and it believes these bodies to be the receptacles of spirits like itself—beings of will, love, wrath, compassion, tears. My senses, which take cognizance of matter, shew me nothing of its essence, any more than they do of the substance which thinks, or wills, or feels. The body, the domain of spirit, is matter, and all this glorious fabric, which we call the universe, is the work of infinite Power, Spirit,—to which we must aspire by holy contemplation, in a constant conviction that, at the verge and brink of this material world, in which we stand, there is an abyss unfathomable to all our thoughts. Unknown existences, incomprehensible, of an infinite world! Of what mighty powers may dwell there,—what wonders may be there disclosed,—what mutation and revolution of being, or what depths of immutable repose, we know nothing. Shut up in our finite sense, we are severed for a while, on our spot of the universe, from these vast, boundless immortalities. How near they may be to us we know not, or in what manner they may be connected with us—around us, or within us! This vast expanse of worlds, stretching into our heavens, many thousand times beyond the reach of our most powerful sight, assisted by the most powerful telescopes,—all this may be as a speck of darkness! And who, with powers fed on matter, and drenched

in sense, shall think to solve the question of what being may be beyond? Let us not by the measure of our sense circumscribe the possibilities of creation, while we pretend to believe in the Almighty; and if, where we cannot know, we must yet needs choose our belief, oh! let us choose with better hope that belief which more humbles ourselves; and in bowed-down and fearful awe, not in presumptuous intelligence, look forth from the stillness of our souls into the silence of unknown being. Minds sturdier than ours, when the kindling aspirations of intelligence had lighted the lamp of hope over the portals of immortality, have burst from their prison-house of clay, to be united in an eternity of unextinguishable joy with their original and commutual existences. And may speculations such as these cheer our spirits in the difficulties of science, and lift them up in high conception of that Power, through whose goodness we possess a revelation to guide us in labyrinths, otherwise inextricable, impervious, and hopeless.

This union of spirit to spirit in an endless hereafter is finely typified by one of the most obvious properties of matter—I mean attraction—and one to which our earliest notice is directed. No cement, that we know any thing of, holds bodies so firmly together as the mutual attraction which nature has imposed upon substances of the same class, genus or kind. And the opposite to this law is *repulsion*. But before we enter upon these topics, we shall take leave to explain some of the leading essential and contingent properties, which may thence serve as legitimate introductions to subjects of such vast and comprehensive inquiry as attraction and repulsion. The first of these, and that upon which we shall now enter, is divisibility.

#### PETROLOGY, OR THE KNOWLEDGE OF ROCKS AND STONES.

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(Continued from p. 328.)

The term AGATE, in mineralogy, is applied to a class of gems, the most remarkable of which are generally arranged according to their colours, configuration, and peculiarities of composition. Of those with a white ground there are three species:—

1. The Mocha stone, as it is commonly but erroneously termed; for although some of these stones are to be found in the mountains of Arabia, near that city, yet the most beautiful and highly prized are brought to the chief towns of the Red Sea by the merchants from Cambray, this variety being exceedingly common in Upper India. It is the same called by some authors achates, having the resemblance of little branches of black leaves. It is produced from small coherent masses of matter, being an union of bodies, varying from each other in their qualities, but readily united by the common silica base. While within the bowels of the earth, this and other varieties seldom present other than a semi-crystalline state, slightly cohering, and very often honey-combed in the interior; although generally these little cells appear to be filled with a black earthy matter, being, as is palpably manifest in some of them, the decomposed matter of cryptogamus. Upon accidental or intentional exposure to atmospheric influences, on dry, gravelly soils, the silica base becomes gradually converted into calcedony, the cells fill up with the like material, and the loose black mould is therein enveloped, the whole aggregate becoming one and indivisible. The time required to effect these changes is regulated by climate and association, for the same body exposed to other than the above influences would pass into another form and become another species.

The Mocha stone exhibits a degree of translucency suited to its stage of change; at first it is opaque, but as the matter becomes more harmoniously disposed within the stone, it gradually becomes first of a flinty or milky-white appearance, and as it ripens (if this term may, with propriety, be applied to inorganic bodies), it gradually becomes translucent, acquiring beauty with age while in this state of nature. In the act of change, these stones very often break to pieces, the fracture revealing its hidden beauties.

2. The dull, milky-looking agate, so common to the Benah, Godawarry, and other rivers

of the East Indies, and also in some parts of Europe; and 3, the lead-coloured agate, called the phassa chates by the ancients, are of the same family as the Mocha stone, although differing from it in the absence of mineralized plants. These varieties also become more translucent in tropical countries on exposure to the atmosphere within shallow streams and upon the beaches, and pass by transition into that more beautiful gem, the white topaz, also common to the East Indies, Ceylon, Borneo, &c.

Of the agates with a reddish ground, there are four species enumerated. 1. An impure one, of a flesh-coloured white, having no pretensions to beauty, and evidently, as observed of previous varieties, imperfect in its change. Sometimes we find it, in its more perfect state, prettily varied or variegated with spots of irregular figures, having limbed edges. It is very common in Germany, was formerly wrought extensively into gun-bins, and it still forms an article of commerce for toys, snuff-boxes, and other trifles. 2. The agate of a pure blood colour, called by the ancients hamachates, or the bloody agate. 3. The clouded and spotted agate, of a pale flesh colour, called by the ancients the cornelian agate or sandachates. 4. The red lead-coloured agate, variegated with yellow, called by the ancients the coral agate, or corallachates. Of the agates with a yellow ground, there are only two known species, the one of the colour of yellow wax, called by the ancients cerachates; the other a very elegant stone of a yellow ground, variegated with white, black, and green, called by the ancients the leonina and leonteceres.

The ribbon agate, consisting of alternate parallel layers of calcedony, with jasper, quartz, or amethyst, occurs in porphyry and gneiss, and is also common to some of the rivers of India. The brecciated agate is a variety of the above, containing small portions of the former lying in a base of amethyst quartz; the most beautiful specimens of this are found in Saxony and Siberia. Fortification agates, found in Scotland and at Oberstein, on the Rhine, are also common in some of the provinces of Upper India. The moss agate is a variety of the Mocha stone, being formed of silica enveloping animal or vegetable objects therein, and which very often maintain their form in the mineralized state.

That the entombed material, representing plants and other natural productions, was in reality derived therefrom, is not only manifest from observations of agate in its various stages of change, but is also placed beyond a doubt by the discoveries of scientific men. Dr. McCulloch discovered in Mocha and moss agates, aquatic conserves coated with iron oxide; but exhibiting their natural forms and colours. Mosses and lichens have also been detected in chlorite. In the possession of the Earl of Powis is said to be an onyx agate, set in a ring, which contains the chrysalis of a moth. Many of the agates, in like manner, with flints, preserve the form of the organic being from whence they have primarily been derived; thus, we find a large class of them termed geodes, which are hollow bodies, maintaining their shape of molluscous animals, and sometimes filled with liquid of crystallized bitumen. In the mountains of Arabia vast quantities of these nodules are sometimes to be observed in this state; but in the older strata they present interiorly crystals of quartz and other bodies.

Agates, from their great abundance, are in little request; but, independent of the extreme elegance and beauty of many specimens, and the very faithful representations of natural objects in others, they are wrought into many useful forms, and from their hardness and smoothness of surface, are valued by polishers, lapidaries, &c. But of the many surprising tales told of natural representations of men and animals, the greater portion may be considered fabulous, or what is more likely, as being the production of art rather than of nature, although many of them, particularly the moss agates, are what is so palpably manifest by the pictured form enclosed, the lapidified repositories of organic bodies.

Upwards of 1,000 having been lately given for the erection of a People's College at Nottingham, there is a prospect of such an institution being erected.